



ER Site No. 229: Storm Drain System Outfall (Building 904 Outfall, SouthEast of TA-II)

ADS: 1309

Operable Unit: Tijeras Arroyo

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Site History

Site 229 is one of a pair of inactive Technical Area II (TA-II) waste-water outfalls for the Site [48](#) high explosive (HE) drain system. Piping for the HE drain system was constructed of cement pipe and was connected to waste-water systems in Buildings 904, 913, and 914. The HE drain system discharged into the Site 229 outfall ditch, of which only a short 40-foot long segment remains today on the northern rim of Tijeras Arroyo. The entire site is 270 feet long and extends eastward from the southern end of HE drain system, down the steep rim of the arroyo, and on to the Tijeras Arroyo floodplain. The discharge of waste water began in about 1947, but was substantially reduced after the early 1960s. Waste water may have discharged at the site until 1992. Neither sanitary (sewer) waste nor storm water was directed to ER Site 229. No stained soil has been identified at ER Site 229.

ER Site 229 received an unspecified amount of floor washdown water from two buildings. Building 904 was built in 1948 and used for weapons assembly, HE research, photo processing, and various types of environmental testing. Buildings 913 and 914 were built in 1951 and used for component assembly and pressure testing. Floors in the rooms where HE compounds were machined or assembled were washed down with water to avoid the hazard of static electricity discharges induced by dry sweeping. The rinse water also contained a variety of chemicals and possibly some radionuclides. In addition to discharging at the ER Site 229 outfall ditch, the ER Site [48](#) HE rinse-water system was connected to the nearby ER Site [227](#) outfall. A catch box upstream of ER Site [227](#) prevented HE particulates from reaching either outfall.

The waste water contained :

- organic compounds including acetone, methylene chloride, trichloroethylene (TCE), methyl ethyl ketone (MEK), nitromethane, carbon tetrachloride, toluene, xylenes, Freon™ compounds, hexane; various alcohols (methanol and isopropyl)
- metals (barium, cadmium, chromium, lead, silver, and titanium)
- HE compounds such as Baratol, Compound B, HMX, RDX, and black powder
- inorganic compounds including ammonium hydroxide and cyanide
- petroleum distillates such as kerosene;
- and possibly traces of radionuclides such as cesium-137, uranium-235/238, plutonium-239, and tritium.

Site 229 covers 0.16 acres. Unfortunately, the historical name for Site 229 is erroneous because no storm water has discharged there. The area surrounding the site has historically been sloped so that storm water was not directed into the outfall ditch.

Several groundwater monitor wells are located in the vicinity of ER Site 229. The nearest monitor well, TA2-W-19, is located 500 feet east of the site. The nearest downgradient water-supply well is KAFB-1, which is located approximately 1.4 miles northwest of the site. Low levels of TCE and nitrate have been detected in perched-system groundwater samples collected at nearby TA-II. The regional aquifer is not contaminated.

The soil is poorly developed with high alkalinity. The subsurface geology consists of unconsolidated alluvial and colluvial deposits derived from the Sandia and Manzanita Mountains. These upper Santa Fe Group deposits consist of sediments ranging from clay to gravel derived from the granitic rocks of the Sandia Mountains and greenstone, limestone, and quartzite derived from the Manzanita Mountains. The depth to Precambrian basement beneath TA-II is approximately 3,000 ft.

ER Site 229 is situated on the steep, northern rim of Tijeras Arroyo but outside the 100-year floodplain. The site is located approximately 1,500 ft west of the active channel of Tijeras Arroyo. Water flows in the active channel near TA-II several times per year.

Constituents of Concern

The COCs for ER Site 229 are: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), HE compounds, cyanide, RCRA metals, and radionuclides (gamma emitters and radionuclides).

Current Hazards

No chemical or radioactive hazards are present in surface or subsurface soil at ER Site 229.

Current Status of Work

In 1994, unexploded ordnance/high explosive (UXO/HE) and radiological surveys were conducted at ER Site 229. No UXO/HE material or radioactive anomalies were detected. Eight soil samples (229-01-A/B through 229-04-A/B) were collected in 1994. Four samples each were

collected at the upper and lower ends of the outfall ditch. The sampling interval extended from the ground surface to 3 feet below ground surface (bgs). The samples were analyzed for VOCs, SVOCs, cyanide, total petroleum hydrocarbons (TPH), HE compounds, target analyte list (TAL) metals, chromium-VI, total Kjeldahl nitrogen (TKN), nitrate/nitrite, tritium, uranium-235/238, plutonium-239, and other gamma-emitting radionuclides. No VOCs, SVOCs, TPH, or cyanide were detected in the soil samples. All metals, radionuclides, and nitrate results were within background.

Passive soil-vapor surveys were conducted in 1993, 1995, and 1999. Of the several hundred Petrex™ soil-vapor collectors that were used in 1993 and 1995 during TA-II and ER Site [45](#) investigations, analytical results from 15 of the soil-vapor collectors are applicable to ER Site 229. These 15 soil-vapor collectors had been installed near the western end of ER Site 229. Each collector was buried at a depth of about 1.5 feet bgs for approximately three weeks before being retrieved and shipped to an analytical laboratory. No SVOCs, or VOCs such as TCE or perchloroethylene, were detected in any of the 15 Petrex™ collectors.

In October 1999, passive soil-vapor samples were collected at ER Site 229 using VaporTec™ collectors. Three locations (TJAOU-229-SVX-01 through TJAOU-229-SVX-03) along the outfall ditch were sampled. After being buried for 30 days at a depth of approximately 0.5 feet bgs, the collectors were analyzed for VOCs and gasoline/diesel range organics with EPA methods 8021M and 8015M, respectively. Each detected value for the VaporTec™ collectors was reported in nanograms (ng) of contaminant that had sorbed onto the activated carbon sampling media. Low levels of six VOCs, including 1,1-dichloroethylene, were detected. Vinyl chloride had the greatest VOC value at 51.9 ng. TCE was not detected in the collectors.

The process knowledge for the Site 229 outfall is partially based on other ER investigations beside the work of the Tijeras Arroyo OU. During March 2000, TA-II Operable Unit (OU) personnel excavated the ER septic and drain systems. This work identified the locations of the septic systems and the effluent-release points within the TA-II boundary. A review of historic and current SNL/NM Facilities Engineering drawings showed that Buildings 904 and 913 had been connected to the Site 48 HE drain system that discharged at ER Sites [227](#) and 229. Except for scattered pieces of cement pipe on the ground surface, the outfall pipe from ER Site [48](#) has not been found outside the TA-II boundary. No TA-II disposal records have been found that identify the volume of waste-water discharge.

Historic aerial photographs were reviewed in February 2001. Twenty-five years of photographs were available for the period of 1951 to 1999. Even though the discharge of waste water began in about 1947, the 1951 photograph does not show much soil erosion. The depth and width of the outfall ditch varies little between the 1951 and 1999 photographs. Not much erosion is evident. Vegetation visible in the photographs suggests that the volume of waste water declined substantially after the early 1960s. Waste water may have discharged at the site until 1993 before the HE drain system was replaced with polyvinyl-chloride (PVC) piping that is presently connected to the City of Albuquerque sanitary-sewer system. The depth and width of the outfall ditch varies little between the 1951 and 1999 photographs.

The historic aerial photographs also show that the construction of underground utilities in 1979 and 1993 disturbed the western end of Site 229. In 1979, a water line was installed and the surrounding area was graded flat; this grading utilized numerous piles of clean fill that had been placed on the west side of the site in the mid-1950s. In 1993, a series of three sewer lines were installed near the western end of the site. This construction also removed the Building 913 septic system near Site 229. Coincidentally, the construction activities produced a 50-foot long section of ditch that was in nearly the same location as the original western end of the outfall ditch. In 1994, the ER Project unfortunately collected several soil samples without recognizing that the construction had disturbed the western part of Site 229.

Exploratory work was conducted on February 23, 2001 in an attempt to find the outfall pipe at Site 229. A backhoe was used to deepen the western end of the outfall ditch, which was the only location outside the TA-II fence where the pipe was likely to remain. At the western end of the site, the ditch was deepened from the pre-existing three feet to a depth of nine feet, which was the safety limit for not destabilizing the adjacent sewer lines. Neither the outfall pipe nor stained soil were found. The excavated material consisted of fill soil, as well as a few pieces each of concrete rubble, scrap metal, and wood. Installation of water and sewer lines in 1979 and 1993 had apparently already removed the outfall pipe. During the exploratory work, the adjacent sewer manhole was opened and three sewer lines were visible. The lines ranged in diameter from six inches to two feet, and were set at depths of seven, 11, and 18 feet bgs.

On February 28, 2001 three soil samples (TJAOU-229-GR-05, TJAOU-229-GR-06, and TJAOU-229-GR-07) were collected at Site 229. The samples were collected from the floor of the newly deepened ditch as well as from the outfall ditch on the floodplain. The potential instability of the ditch walls did not allow any samples to be collected between location TJAOU-229-GR-05 near the manhole and location TJAOU-229-GR-06 which is on the edge of the floodplain. Location TJAOU-229-GR-07 is located on the floodplain. Hand augers were used to collect soil samples to a maximum depth of 14 feet bgs. No stained soil was observed. The soil samples were shipped to an off-site laboratory with the analytes consisting of VOCs, SVOCs, HE, metals, and radionuclides. Analytical results indicate that no significant contamination is present.

In March 2001, the construction-related section of the ditch was backfilled because the ditch was an instability hazard to the adjacent sewer lines. Facilities Engineering used the just-excavated soil along with several dump-truck loads of clean-fill soil to backfill the westernmost 40 feet of the ditch to the elevation of the adjacent manhole.

In June 1995, the ER Project submitted a risk-based no further action (NFA) proposal to the New Mexico Environmental Department (NMED) for ER Site 229. After receiving the June 1996 Notice of Deficiency (NOD) comments from NMED, SNL/NM submitted a NOD response in October 1996, which included a risk assessment using the 1994 analytical results. No significant contamination was apparent; however, some of the detection limits were too high for a definitive conclusion to be made by NMED. In October 1999, NMED issued a second set of NOD comments that requested the collection of additional soil samples. In December 1999, SNL/NM submitted a second NOD response which confirmed the need for additional work. The March 2001 sampling completed the field-work request.

Future Work Planned

The ER Site 229 NOD response will be submitted in 2003. The NOD response will include four sets of analytical results: shallow-soil data for the March 2001 hand augering, deep-soil data for the March 2001 borehole, four quarters of soil-vapor results from monitor well 227-VW-01, and reformatted data tables for the results previously submitted in the June 1995 NFA Proposal and the October 1996 NOD Response. The ER Site 229 NOD response will be submitted in tandem with the ER Site 227 NOD response.

Waste Volume Estimated/Generated

No waste was generated at ER Site 229.

Information for ER Site 229 was last updated Jan 31, 2003.